Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of Amendment of Parts 2 and 97 of the Commission's Rules to Create a Low Frequency Allocation for the Amateur Radio Service To: The Commission	)	ET Docket No. 02-98 RM-9404

PETITION FOR RECONSIDERATION

1. In the Commission's Report and Order 03-105A1, adopted April 29, 2003, the Commission denied RM-9404, part of Docket 02-98, which requested allocation of a portion of the spectrum between 160 and 190 kiloHertz be allocated to the Amateur Radio Service.

2. Unfortunately, the denial was based upon the largely unsubstantiated claims of a few utilities and perhaps the only company still in the business of manufacturing carrier shift PLC systems. The Commission, in my opinion, erroneously concluded that the Power Line Carrier (PLC) communication media is critical to infrastructure security of virtually all of the electric power transmission and substation system serving North

America. And, based upon this conclusion, the Commission failed to take proper action by virtue of their conclusion to continue to rely upon Part 15 restrictions to adequately protect such alleged vital communications.

3. If, in fact, the Commission truly believes, as is stated in Report and Order 03-105A1, that the 160-190kHz spectrum is of vital necessity to the proper and secure operation of the North American electric power grid, then I ask that the Commission reconsider its decision and reopen this matter for further consideration. And as part of that reconsideration, that the Commission consider allocation of a portion of the 160-190kHz band to the electric power industry as a primary assignment. Along with this assignment, the incorporation of narrow bandwidth channels within this band; type-acceptance of secure, encrypted narrow band equipment; and finally, licensure and specific channel assignment for operation. Perhaps one of the most important roles of the Commission is to ensure that vital communications services are capable of operating effectively and without interference. Surely, to continue to leave this band to unguarded Part 15 operation is to look away from a matter that compels further Commission study and resolution in the interest of public safety and National Security. Conditioned, of course, upon the legitimacy of the claims of its importance by several utility commenters, utility employee members of the IEEE, and the electric utility industry telecommunications advocate, the United Telecommunications Council.

4. PLC application on transmission lines in the Western United States has not demonstrated that PLC is a vital necessity for proper system operation. The remarks submitted by Mr. Jim Detmers, formerly of the Pacific Gas and Electric Company and now with the California Independent System Operator offer no specifics as to the nature of PLC application on lines and substations operated under ISO authority. Understandably so, as I recall from my former employment as a Transmission and Substation Superintendent with the Pacific Gas and Electric Company, that there were no critical, primary protection or transfer trip applications of PLC within at least Northern California. Only low priority, out of zone, trip-blocking schemes.

5. As I attempted to explain in my earlier comments, but apparently not convincingly enough, responsible electric utility companies have long ago substituted other, more reliable media for PLC in vital and critical protection and control communication applications. Namely, redundant-path telephone company leased or power utility owned wire lines, redundant microwave paths and redundant fiber optic routings configured as self-healing rings. These ring configurations offer superior reliability to common structure, single corridor route PLC. By far and again superior, if properly designed such that both pathways for protection and control are not on the same structures, in the same conduit bank or even the same transmission line corridor. Redundant path, self-healing ring configurations, whether microwave, telecom

wireline or fiber-optic-based are, and have been, the norm for critical path and important power system infrastructure for decades.

6. Perhaps my lack of examples and specificity were to blame. In any case, the Pacific Gas and Electric company more than 50 years ago chose redundant, separate-path point-to-point multiplexed microwave as a primary means for protective relay communication, transfer trip and secure control between transmission line termination points, substations and generating plants. More recently, about 15 years ago, its microwave system was supplemented with a fiber optic redundant ring configuration for critical protection and control. Self-healing, redundant ring configurations permit complete severance of a communication path within the ring without the loss of control or communication to or from any single termination point in the ring system. Such communication schemes were only employed where absolutely necessary, as no such system is inexpensive. Protection communication paths were employed where the intelligence of modern, stand-alone solid state microprocessor based relays was, in and of itself, insufficient to prevent out of zone tripping or for more sophisticated, secure applications such as differential relay interconnection, load shedding, breaker failure or other transfer trip applications.

7. PLC was, and still is used on some of PGandE's system as a means to prevent back up tripping to avoid tripping by circuit breakers unassociated with a distant fault.

These are what are referred to as blocking schemes, in power system vernacular. I am almost certain that the same, non critical application of PLC still holds true for the Southern California Edison Company (subsidiary of Edison International), and both the United States Department of Energy's Western Area Power Administration and Bonneville Power Administrations. PLC malfunction, absence or intentional mis-operation would not cause a false trip of a transmission circuit breaker or inflict damage on power system components when used as part of a blocking scheme.

8. Let me share just my personal experience of about 9 years being responsible for about 20% of PGandE's transmission and substation system. Personnel under my direct supervision experienced many instances of PLC system outages, caused by everything from PLC tuning boxes getting wet or otherwise malfunctioning to failure or outright collapse of stacked, porcelain-insulated coupling capacitors following significant earthquakes. In the case of the tuning boxes, their repair, component replacement or adjustment of the tuned circuits required that the transmission lines be taken out of service, since these boxes contain parts energized at voltages approaching the line to ground voltage of the transmission line under certain circumstances. The ability to take many of these lines out of service to repair the disabled PLC was limited, sometimes, to days, if not months, due to load conditions. The result: Virtually no impact on system operations.

9. The cost of PLC installation was, of course, not completely described in comments submitted to you in this matter. Because of the nature of the PLC signal being impressed upon the transmission line between terminations, very large and expensive air-core series reactors must be placed in series with the conductors of transmission lines at terminations. These inductors must be capable of carrying hundreds and often thousands of Amperes of current and be insulated to withstand the full line-to-ground potential of the line. Significant additional space is required for the reactor, its supporting porcelain insulator structures and foundation support for the assembly is required. A typical PLC line reactor would require at least an additional 50 by 50-foot space adjacent to a substation for just one reactor assembly, capacitor stack and tuning box arrangement. Costs associated with the construction of such an arrangement would likely exceed $100,000 to $200,000 in present day costs. And, since at least two would be required, one could double the cost or roughly $400,000 just in termination costs, to say nothing of the cost of the additional real estate and the receiving and transmitting terminal equipment at each end of a two terminal line. This configuration must be repeated for each and every line termination or tap point along the line to prevent excessive loss of the PLC signal. Apparently, some commenters suggested, or had employed, multiple phase PLC on the same transmission line, thus tripling the above costs and opportunities for system failures in the event of a structure or line damage event.

10. For at least the last 15 years it has been common place for electric utilities to replace their existing counterpoise or static wire overhead lightning protection conductors which run directly above energized transmission line conductors, with new counterpoise cables containing multiple fiber core tubes surrounded by steel wire. The information capacity of these fiber optic cables are most often sold to communication firms and utilized, in part, by the utilities themselves. Since these share the same supporting structures as transmission lines, they are often redundantly installed on adjoining or distant lines to improve reliability, in the event of a structure failure or other common path event. It has simply been intentionally misstated by commenters that fiber optic paths do not already exist along important corridors or that their costs would be prohibitive. In fact, it is commonplace to find protective relays manufactured with built-in fiber-optic-interface terminations since use of fiber optic cable for communication and control by the power industry has become so commonplace.

11. I did not state that there were no locations still using PLC in critical primary protection, transfer trip and load shedding protection schemes. There are very few, if any in the West. Perhaps rural Arizona was an exception. Sadly, if in fact there still are such PLC applications in use, they should be replaced with secure communication media, or upgraded to an encrypted modulation scheme so as to prevent inadvertent or nefarious operation. Applications employing the present rudimentary PLC

operating mode certainly deserve no more operational significance today than a household doorbell.

12. It was and is simply ludicrous for the United Telecommunications Council to claim that lists of operating frequencies of any such simplistic schemes should be kept secret when the physical appearance of large wavetrap series inductors at substations and a simple receiver serve to reveal all that would be necessary for someone with nefarious intent at a particular location. As mentioned in my earlier comments, the National Infrastructure Protection Division of the Homeland Security Department should be advised of the potential vulnerability of any remaining applications of simplistic guard-and-shift PLC as a medium for electric power system primary overcurrent protection and/or transfer trip or load shedding scheme communication.

13. Ironically, the Petition filed by the American Radio Relay League has brought forth commentary which, if true, reveals important National Security deficiencies in utility system configuration at several commenting utilities, which must be addressed and corrected to ensure the proper security and protection of their systems from intentional nefarious acts. The Commission's decision not to act, in view of these claims certainly begs the question of why the Commission bothers to license any services at all, since the non-interference provisions of Part 15 could be applied to just about anything. Will the Commission be soon applying the same Part 15 'non-

interference' analogy to other vital public safety or law enforcement frequency assignments in the near future? I would certainly hope not.

14. PLC must be reinvented from its 1930's concept to a sufficiently secure and reliable narrow-band mode for power system protection and control communication. Or, it should be abandoned altogether, as it has for most critical applications, for the reasons and examples included above. Arguments that it would be very costly to replace are, for the most part moot, since alternative paths already exist in most instances for transmission corridors of significance and provide electric utilities with additional revenue. The cost of telephone company leased subscriber lines are only a few dollars per circuit mile per month and are a low cost alternative, if microwave or fiber optic options are not justifiable. And, in most instances, telephone company lines are not underbuilt by telephone companies on the same electric transmission line structures in order to avoid telephone company equipment damage in the event of a transmission line fault where copper communication conductors are still employed.

15. It is important to note that the Commission has historically taken action to improve the efficient use of the radio spectrum on several occasions. Take, for example, the mobile radio service. The Commission has reduced the operational channel bandwidth several times from its original inception of 60kHz per channel to the present 12.5kHz channel bandwidth. Each change has required modification or

replacement of two-way radio equipment by licensed users. If the Commission were to agree that a narrow-band, encrypted form of PLC should replace what is now deployed, only the terminal receiving and transmitting electronics at PLC installations would need to be replaced, not the very expensive wave trap reactor and tuning box equipment already in place.

16. Thank you in advance for your consideration and for allowing me to file this document. I would be willing to assist the Commission Staff in any way should you choose to reopen this matter. You may contact me at the address included below.

/s/

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